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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

REPORT OF PINE BEETLE SURVEYS AND STUDIES ON PROTECTION UNITS OF KLAMATH FOREST PROTECTIVE ASSOCIATION

By
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Entomologist

November 25, 1933.

Forest Insect Field Station
445 U. S. Court House
Portland, Oregon.

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REPORT OF

PINE BEETLE SURVEYS AND STUDIES

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Introduction.

Ever since 1921, the Bureau of Entomology has carried on annual surveys of the forested areas of Klamath and Lake Counties, Oregon to determine the losses and the trend of barkbeetle epidemics. At first these surveys were in connection with the Southern Oregon-Northern California Pine Beetle Control Project, and after 1924 were continued for the purpose of studying epidemic trends on sample plots. Incidental to this purpose, those surveys have been of value in determining the need for control work in the region.

The present report summarizes the results of the surveys made during the summer of 1933. These were conducted largely through the assistance of the personnel of the E. C. W. camps. On the Keno District, (former Area 1) the permanent sample plots were cruised during September by Mr. J. M. Whiteside, and a crew of two CCC helpers from the O & C camp (C-9) at Moon Prairie. On the Bly District Mr. Buckhorn employed two crews of CCC men from the private land camp (P-203) at Bly, Oregon to cruise the 14 permanent sample plots in that area (old areas 2 and 3). These crews were employed during August and September and after a period of training did very satisfactory work. Late in September, Mr. Beal joined these crews and with their help made emergence counts from a large number of bark samples to determine to what extent the broods had been destroyed by the winter freeze.

KENO DISTRICT

This area which lies west of Klamath Falls, east of Pinehurst and north of the California line, was formerly designated as Area 1 of the Southern Oregon-Northern California Pine Beetle Control Project. The timber is largely in private ownership, but with some Oregon-California Land Grant Lands, and a small acreage of Rogue River National Forest. The Weyerhaeuser Timber Company owns the greater part of the private timber lands. Logging operations started by this company in 1928 in the Clover Station unit have already disposed of the timber on a large part of this unit south of Klamath River, the Chase Butte unit has been largely cut over or burned over so that the beetles are no longer much of a factor.

The estimated area and timber volumes now on the area are given in the following table:

TABLE NO. 1

ACREAGE AND TIMBER RESOURCES

Ownership	Acres	Volume M.B.M.	% Volume
Rogue River NF	8,000	107,000	4%
O & C Land Grant	58,000	483,000	17%
Private Lands	235,000	2,180,000	77%
Other	4,000	50,000	2%
Total	305,000	2,820,000	100%

Insect Damage

The western pine beetle working in the ponderosa pine stands has been the barkbeetle responsible for the greatest damage in the area. The mountain pine beetle has caused some loss of sugar pine, and together with Ips emarginatus has been responsible for the death of some ponderosa pine but by far the bulk of the damage has been due to the work of the western pine beetle. Since surveys were started in this area the loss of timber has been estimated as follows:

Table No. 2

BEETLE KILL OF PONDEROSA PINE ON THE KENO AREA

Loss on Check Sections
Acres-4,170
Volume 1921-63,155 MBM
" 1932-54,379 MBM

Loss on Total Area
Acres-304,000
Volume 1921-3,730,100 MBM
" 1932-2,850,000 MBM

Beetle Kill on Plots Volume MBM	Beetle Kill on Plots Percent %	YEAR	Beetle Kill on Area Volume MBM	Beetle Kill on Area Percent %
733	1.16	1921	34,970	.93
721	1.14	1922	26,040	.70
632	1.00	1923	22,330	.60
1,510	2.39	1924	39,900	1.07
1,847	2.92	1925	73,590	1.97
1,913	3.13	1926	52,550	1.41
1,034	1.75	1927	40,530	1.09
1,013	1.74	1928	33,880	.91
1,185	2.07	1929	35,270	.95
1,045	1.86	1930	29,000	.88
1,766	3.25	1931	44,000	1.47
1,320	2.43	1932	31,000	1.10
667	1.23	1933	17,000	.60
15,384	24.40% (1)	Total	480,060	12.90% (1)

(1) Percent of 1921 Volume

Thus of the stand originally on the ground in 1921 nearly a half billion feet or 12.9 percent has been killed during the past 13 years. Partly offsetting this loss is growth which during the same period has amounted to about 6 percent of the stand. Thus a net loss of about 7 percent has occurred on this area. Some of the check plots show a net loss of 30 percent, and the average of seven plots shows a net loss of 14 percent during the 10 year period 1921-30.

As will be noted from the above table, the infestation reached a low point in 1923, then increased until 1925, dropped again in 1928, increased to 1931, and then dropped in 1933 to the lowest point since 1923. These fluctuations follow to a considerable extent the changes in tree growth rate-an index of tree vigor.

Effect of Winter Freeze 1932-1933

The period of low winter temperatures during December 1932 and February 1933, which did such good work in the killing the overwintering barkbeetle broods through eastern Oregon and northern California, did not effect this particular area to the extent noted on areas more exposed to the open desert conditions. Lying across a pass of the Cascade Range, the low temperatures, especially to the west, were somewhat moderated by western Oregon coastal conditions. Minimun temperatures are estimated as having only dropped to -10° F. on this area as compared with -26° and -35° in areas where the greatest kill of barkbeetle larvae was noted. Bark counts of larval mortality indicated that a much smaller portion of the broods had been effected.

Larval counts from 31.5 square feet of bark showed a 33.3% kill. However, emergence counts made by Mr. Beal and Whiteside, from 204 square feet of bark showed an average emergence of 21 beetles to the square foot or a reduction of 66.7% from the average of 63 beetles per square foot which previous counts have shown to be the average emergence.

The number of trees killed this year on the check plots, as compared with those killed in 1932 showed a reduction of 59.6%, which was about the same reduction secured from areas where the winter kill of broods had been heavier.

Recent Infestation

Over most of the eastern Oregon pine areas, the pine beetle damage reached its peak in 1932. On this area the peak was reached in 1931, and the infestation declined during 1932 and 1933 on nearly all plots. In fact ever since 1923, this area has been one year ahead of all the others in changes of barkbeetle epidemic trends. No explanation is apparent except as mentioned before. Climatic conditions are not typical of the rest of the pine region.

Data secured from recent surveys of the permanent sample plots

TABLE NO. 3

ESTIMATED 1932 LOSS FROM BEETLES

KENO DISTRICT-KLAMATH CIRCLE

Unit	Acreage & Volume of Pine			Loses of 1932			Status
	Acres	Pine Sec.	Volume M.B.M.	Trees	Volume M.B.M.	% Stand	
Jenny Creek	44,800	30	350,000	5,600	4,500	1.3	Increasing Epidemic
Johnson Prairie	44,800	22	600,000	4,200	5,000	.8	Increasing Epidemic
Pokegama	51,200	35	700,000	6,400	6,000	.9	Decreasing Epidemic
Clover Station	48,000	10	300,000	6,000	6,000	2.0	Mostly cut over-Heavy epidemic outside
Round Lake	19,200	12	200,000	3,300	2,500	1.2	Heavy epidemic but decreasing
Aspen Lake	16,000	18	250,000	2,500	2,500	1.0	Decreasing Epidemic
Eagle Ridge	16,000	14	200,000	2,000	2,000	1.0	Decreasing Epidemic
Chase Butte	64,000	10	250,000	3,000	2,500	1.0	Mostly cut over-Endemic
Totals	304,000	151	2,850,000	33,000	31,000	1.1	

is given in Table No. 9. It will be noted that the infestation amounted to 3.25 percent of the stand in 1931, dropped to 2.43 percent in 1932, and to 1.23 percent in 1933.

The Loss of Timber During 1932.

On the basis of the survey plots, the total amount of ponderosa pine killed by barkbeetles on this area during 1932 is estimated at 31,000,000 board feet or about 1.1 percent of the stand. The distribution of this loss by units is shown in Table 3, and the distribution by ownership is given in Table 4.

The Loss of Timber During 1933

At the time the surveys were made, August 28th to September 15th, ordinarily only from 50 to 65 percent of the attacks of the year can be located, so that an allowance must be made in the estimates. After making such an allowance it is still evident that there has been a very marked reduction in losses for 1933 over those of 1932. The plots indicate an average reduction of 50 percent. It is estimated that the total loss for 1933 on this area will not exceed 17,000,000 board feet, or about .6 percent of the stand.

The estimated loss of timber on the area by ownership for the past two years is as follows:

TABLE 4.

Ownership	Percent of Stand Killed		Volume of Timber Killed M.B.M.	
	1932	1933	1932	1933
National Forest	.5	.3	500	300
O & C Lands	1.00	.5	4,800	2,400
Private	1.18	.6	25,200	14,000
Other	1.00	.6	500	300
Totals	1.10	.60	31,000	17,000

Conclusions

The recent cruises show that there has been a 62 percent reduction in the volume of timber killed on this area in 1933 from that killed in 1931, when the plots showed an average loss of 3.25 percent. Some portions of the area, such as Aspen Lake, and Eagle Ridge, now carry an infestation, which is only slightly more than normal. Other units are still epidemic, notably the Clover Station, Pokegama and Round Lake units. The infestation on the Johnson Prairie, and Jenny Creek units is not aggressive.

Under the present conditions of declining infestation, with no aggressive epidemic centers and a good chance for further improvement

next year, no control work is recommended for this area this season.

BONANZA DISTRICT

This district comprises the private timberlands east of Klamath Falls and south of the Klamath Indian Reservation comprising a portion of what was formerly designated as Area 2.

Since 1921, when the southern Oregon-northern California pine beetle control project was started, there have been some very radical changes in the character of the forest cover over most of this area. Logging operations have removed nearly all of the merchantable timber from most of the units formerly included in this area, and fires have added to the destruction in other portions. Now the only virgin ponderosa pine left unmolested by cutting operations and still subject to beetle attack is to be found in the extreme eastern portion of the district on the Royston, Goodlowe, Gerber and Willow Flat units. Since the situation on these units is so comparable to that on the Bly District, they will be lumped with the Bly units for the sake of convenience.

BLY DISTRICT

This district comprises the private and national forest ponderosa pine timberlands tributary to Bly, Oregon and lying on the upper slopes of the Sprague River Valley. Most of the area is in private ownership with most of the uncut stands belonging to the Weyerhaeuser Timber Co. Portions of the Fremont National Forest are included in the area.

The pine beetles have been active in this district since 1917 and have caused staggering losses of timber. Recently logging operations have moved into the district and the bulk of the mature pine on at least two units has been removed.

Estimates of the remaining uncut pine stands are given in the following table by present ownership:-

TABLE NO. 5
TIMBER ACREAGE AND PINE VOLUMES
BLY DISTRICT
By Ownership 1933

Ownership	Acres	Volume of Pine M.B.M.	Percent Volume
National Forest	60,000	485,000	26%
Public Domain	28,000	100,000	5%
Private	142,000	1,300,000	69%
Total	230,000	1,885,000	100%

Insect Damage

The pure ponderosa pine stands in the Bly District have suffered heavily from barkbeetle losses ever since the beginning of the recent outbreaks in 1917. Epidemic conditions have moved over the area, fluctuating somewhat from year to year, but in general taking a steady toll of timber, until today large tracts are so depleted of the mature merchantable pine as to be no longer worth harvesting. A review of the loss figures from the sample plots in old areas 2 and 3 give an interesting resume of the fluctuations in those losses.

TABLE NO. 6.

BEETLE KILL OF PONDEROSA PINE ON

Old Area 2

Year	Loss on Check Sections Acres 4,050 Volume 1921-58,498,M.B.M. Volume 1932-41,409 M.B.M. Beetle Kill on Plots		Loss on Total Area Acres-424,000 Volume 1921-4,785,000 M.B.M Volume 1932-3,000,000 M.B.M. Beetle Kill on Area	
	Volume B.F.	Percent %	Volume B.F.	Percent %
1921	699,820	1.20	47,696,000	1.00
1922	823,150	1.42	40,629,000	.85
1923	539,870	.94	24,528,000	.51
1924	1,217,690	2.18	52,380,000	1.10
1925	1,681,590	3.10	99,620,000	2.08
1926	2,923,090	5.70	119,680,000	2.50
1927	2,496,550	5.10	97,980,000	2.04
1928	2,008,760	4.45	76,090,000	1.59
1929	1,030,140	2.25	45,780,000	.96
1930	1,008,650	2.25	44,500,000	1.45
1931	1,499,370	3.46	68,000,000	2.27
1932	1,330,990	3.18	62,500,000	2.08
1933	529,000	1.28	25,000,000	.84
Total	17,788,670	30.4%*	804,383,000	16.8%*

* Of the 1921 Volume

TABLE NO. 7

BEETLE KILL OF PONDEROSA PINE ON

Old Area 3.

Year	Loss on Check Sections Acres-4,280 Volume 1921-82,274 M.B.M. Volume 1932-63,667 M.B.M. Beetle Kill on Plots		Loss on Total Area Acres-505,000 Volume 1921-4,236,300 M.B.M. Volume 1932-3,960,000 M.B.M. Beetle Kill on Area	
	Volume BF	% Loss	Volume BF	% Loss
1921	570,610	.69	37,035,000	.87
1922	708,630	.87	38,307,000	.90
1923	685,640	.85	27,570,000	.65
1924	1,157,130	1.45	37,080,000	.87
1925	1,799,310	2.31	79,670,000	1.88
1926	2,188,140	2.88	106,450,000	2.52
1927	2,079,896	2.82	123,350,000	2.91
1928	1,466,320	2.03	83,400,000	1.97
1929	974,210	1.37	44,300,000	1.05
1930	1,329,560	1.90	65,900,000	1.66
1931	2,280,065	3.37	92,000,000	2.32
1932	3,154,695	4.90	134,000,000	3.37
1933	783,500	1.23	34,000,000	.85
Total	19,177,706	23.3 (1)	903,062,000	21.3 (1)

(1) Percent of the 1921 volume

As will be noted from the above tables, the infestation on Area 2 reached its peak during the period 1926 to 1928 when on the check sections 15.25 percent of the stand was killed. The losses again increased in 1931 and 1932 but did not reach the previous high largely because the stands were already heavily depleted.

On area 3, only 7.73 percent of the stand was killed during the three years 1926-28 so that there was more to be killed later on. Thus the epidemic of 1931-32 killed 8.27 percent in the two year period, bringing the total of 13 years of loss to 23.3 percent as compared with 30.4 percent of the stand on Area 2.

The Winter Freeze of 1932-33 in the Bly District

From all account the two periods of cold weather in December 1932 and February 1933 exerted their full effect upon the infestation in the Bly district and brought about heavy destruction of broods.

TABLE NO. 8.

ESTIMATED 1932 LOSS FROM BEETLES

BLY DISTRICT-KLAMATH CIRCLE

Unit	Acreage & Volume of Pine			Losses of 1932			Status
	Acres	Pine Sec	Volume M.B.M.	Trees	Volume M.B.M.	Percent Stand	
Royston	12,000	18	100,000	6,000	4,200	4.2	Increasing
Goodlowe	12,000	10	75,000	3,600	2,500	3.3	Increasing
Willow Flat	38,000	35	240,000	14,000	10,500	4.4	Increasing
Owens	38,000	35	420,000	18,000	18,000	4.3	Increasing
Whitworth	32,000	12	150,000	13,000	6,500	4.3	Increasing
Deming Creek	30,000	22	195,000	10,000	8,000	4.1	Decreasing
Meryl Creek	51,000	45	505,000	25,000	22,000	4.4	Increasing
Merritt Creek	17,000	15	200,000	8,000	8,000	4.0	Increasing
Totals	230,000	192	1,885,000	97,600	79,700	4.2%	

Larval counts made soon after the freeze show the following percentages of kill in this area:-

		Percent of kill of larvae
Quartz Valley Unit	December freeze only	67.5%
" " "	Dec. & Feb. freeze	80.0%
Klamath Indian Res.	" & " "	89.8%
Long Bell tract	" & " "	78.5%
" " "	" & " "	68.6%

Late in October, Beal and Whiteside with the help of CCC men from the private land camp at Bly (P-203) made a series of emergence counts from the 1932 overwintering brood trees which showed an average emergence of only 11 beetles per square foot. When compared with a normal emergence of 63 this represents a reduction of 83 percent, which ranks with the best reduction secured anywhere in the region as a result of this freeze.

Recent Infestation

The infestation in the Bly District had been steadily increasing since 1929, and reached a new peak of aggressiveness in 1932. Never before had losses on the better sites and in the mixed fir type been so heavy. The check plots showed a loss of 4.90 percent of the stand for the year 1932 alone. The loss for units still uncut in the Bly district are shown in Table No. 9, with a loss of nearly 80 million board feet or 4.2 percent of the stand.

Then came the winter freeze, mentioned above and two years of improved growth conditions (1932 and 1933) and the infestation dropped very abruptly.

The check sections of the Bonanza and Bly Districts show the marked reduction in losses between 1932 and 1933 even after an allowance has been made for trees not found in the fall surveys. The eight plots of the Bonanza district showed a 59 percent reduction, and the seven plots of the Bly District showed a 75 percent reduction, which is very closely in line with the proportion of broods killed during the winter.

The 1933 loss in the Bly District is tentatively estimated at 24,000 trees with 20,000 board feet or about 1.06 percent of the stand. Thus in a single year the infestation has dropped to a normal status over most of the area. Only at the higher elevations in the better sites was 1933 group infestation still in evidence. On the Willow Flat, Owens, Whitworth, Quartz Valley, and Meryl Creek units, the 1933 infestation still was in excess of 1 percent of the stand and with more than 100 infested trees per section.

Control Work

No control work was conducted in any of the areas during the fall 1932-

spring 1933 period.

Conclusions

Although the situation now looks favorable for a return to normal infestation conditions in the Bly District, there can be no assurance of a continued decline if weather and growth conditions again become unfavorable. The best insurance against the rise of another sudden epidemic would be the cleaning out of all epidemic centers left on these units. This could be accomplished this year at much less expense than at any time in the last ten years. However, if the region has another winter of normal or above normal precipitation, or another period of subzero weather (-20° F or colder) there would be no need to do further control work this season. Therefore it will be best to wait until next spring to see what this winter brings and then do control work in the better stands only if more favorable climatic conditions fail to materialize.

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Entomologist

TABLE NO. 9.

ANNUAL BARKBEETLE PLOT SURVEYS
on
KENO DISTRICT-KLAMATH CIRCLE
(Formerly-Area 1)

Season 1933.

Unit and Location of Plot	Acres	Volume Stand M.B.M.	Date of Survey	Losses: Year of Attack	Trees Killed	Volume	% of Stand	Percent of Increase* or Decrease-
			9-7-31	1931	151	158,380	1.6	
Aspen Lake	640	9,915	7-13-32	1932	117	87,600	.9	-45%
T37S R7E Sec 34			9-15-33	1933*	68	53,000	.5	-40%
			8-20-31	1931	695	562,640	5.4	
Clover Sta	640	10,359	6-30-32	1932	586	487,340	4.8	-11%
T38S R6E Sec 36			9-11-33	1933*	205	180,000	1.7	-64%
			9-11-31	1931	251	208,620	2.0	
Eagle Ridge	600	10,243	7-11-32	1932	144	105,180	1.0	-50%
T37S R7E Sec 16			9-16-33	1933*	77	72,000	.7	-32%
			9-2-31	1931	176	146,460	3.1	
Jenny Creek	620	4,680	6-18-32	1932	238	164,570	3.5	*11%
T40S R4E Sec 34			8-31-33	1933*	65	50,000	1.1	-70%
			8-31-31	1931	111	144,130	1.3	
Johnson Prairie	630	10,848	6-23-32	1932	156	199,585	1.8	*37%
T39S R5E Sec 7			8-28-33	1933*	74	145,000	1.3	-27%
			9-17-31	1931	209	207,915	5.7	
Pokegama	480	3,653	6-27-32	1932	149	99,565	2.7	-52%
T40S R5E Sec 36			9-6-33	1933*	82	82,000	2.2	-18%
			9-14-31	1931	312	337,780	7.2	
Round Lake	560	4,681	7-8-32	1932	242	177,960	3.8	-47%
T39S R8E Sec 5			9-14-33	1933*	85	85,000	1.8	-52%
				1931	1905	1,765,925	3.25	
Total	4170	54,379		1932	1632	1,321,300	2.43	-25%
				1933*	656	667,000	1.23	-50%

*1933 Loss partly estimated

ANNUAL BARKBEETLE PLOT SURVEY
on
BONANZA DISTRICT-KLAMATH CIRCLE
(Formerly part of Area 2)
Season 1933

Unit and Location of Plot	Acres	Volume of Stand M.B.M.	Date of Survey	Losses: Year of Attack	Losses: Trees Killed	Losses: Volume	Losses: % of Stand	Percent of Increase* Decrease-
			7-20-32	1931	487	594,840	6.4	
Antelope	630	6,204	7-20-32	1932	169	119,360	1.9	-70%
T36S R8E Sec 28			9-28-33	1933*	135	91,000	1.5	-24%
			7-16-32	1931	134	41,625	1.6	
Chiloquin (cut)	620	2,513	7-16-32	1932	74	21,345	.8	-49%
T35S R7E Sec 24			9-26-33	1933*	78	20,000	.8	-6%
			7-28-32	1931	295	202,290	5.3	
Ferguson	550	3,827	7-28-32	1932	326	184,215	4.8	-9%
T35S R 13E Sec 33			8-31-33	1933*	115	73,000	1.9	-60%
			8-6-32	1931	272	193,170	4.1	
Gerber	540	4,695	8-6-32	1932	193	162,985	3.5	-16%
T38S R13E Sec 24			8-1-33	1933*	45	25,000	.5	-85%
			8-8-32	1931	197	157,955	1.8	
Goodlowe	600	8,872	8-8-32	1932	286	193,180	2.2	*22%
T39S R13E Sec 5			8-9-33	1933*	75	75,000	.8	-61%
			8-4-32	1931	245	173,930	3.1	
Royston	500	5,544	8-4-32	1932	297	201,815	3.6	*16%
T38S R12E Sec 10			8-7-33	1933*	75	54,000	1.0	-73%
			7-23-32	1931	177	163,930	2.1	
Sycan	600	7,653	7-23-32	1932	144	132,380	1.7	-19%
T34S R12E Sec 2			9-13-33	1933*	80	60,000	.8	-55%
			8-1-32	1931	295	213,255	3.6	
Willow Flat	630	5,842	8-1-32	1932	460	337,050	5.8	*16%
T37S R14E Sec 20			8-29-33	1933*	155	151,000	2.6	-55%
				1931	2102	1,540,995	3.4	
Total	4,670	45,150		1932	1949	1,352,330	3.0	-12%
				1933	758	549,000	1.2	-59%

*1933 Loss partly estimated

TABLE No.11

ANNUAL BARKBEETLE PLOT SURVEY

on

BLY DISTRICT-KLAMATH CIRCLE

(Formerly part of Area 3)

Season 1933

Unit and Location of Plot	Acres	Volume of Stand M.B.M.	Date of Survey	Losses				Percent of Increase* Decrease-
				Year of Attack	Trees Killed	Volume	% of Stand	
		5,125	8-30-32	1931	657	524,050	10.2	
Deming Creek	600		8-30-32	1932	651	423,010	8.2	-19%
T36S R15E Sec 8			9-15-33	1933*	92	48,000	.9	-89%
			10-10-31	1931	289	239,520	3.0	
Deming Creek	580	7,913	8-27-32	1932	334	225,245	2.8	-6%
T36S R15E Sec 25				1933*	73	77,000	.9	-66%
			9-12-32	1931	213	190,250	1.4	
Merritt Creek	620	13,200	9-12-32	1932	337	354,045	2.7	*86%
T33S R14E Sec 34			9-12-33	1933*	74	87,500	.7	-75%
Meryl Creek			10-6-31	1931	639	514,280	4.6	
	640	11,289	9-8-32	1932	715	476,090	4.2	-7%
T35S R14E Sec 11			9-18-33	1933*	108	100,000	.9	-79%
			9-5-32	1931	381	300,040	2.5	
Meryl Creek	640	12,132	9-5-32	1932	840	724,305	6.0	*141%
T35S R15E Sec 20			9-19-33	1933*	170	156,000	1.3	-78%
			10-15-31	1931	289	235,395	2.1	
Owens	560	11,084	9-14-32	1932	531	510,725	4.6	*117%
T38S R15E Sec 1			8-18-33	1933*	280	219,000	2.0	-57%
			8-24-32	1931	489	276,530	5.5	
Whitworth	640	5,056	8-24-32	1932	952	441,275	8.7	*60%
T37S R16E Sec 17			8-24-33	1933*	160	96,000	1.9	-78%
				1931	2957	2,280,065	3.5	
Total	4280	65,799		1932	4360	3,154,695	4.8	*38%
				1933	957	783,500	1.2	-75%